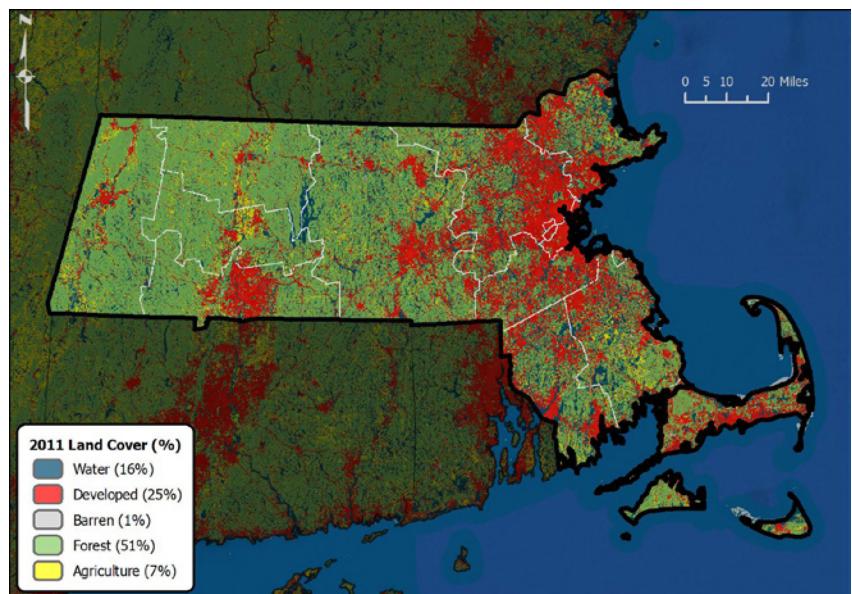


2016 Forest Health MASSACHUSETTS *highlights*

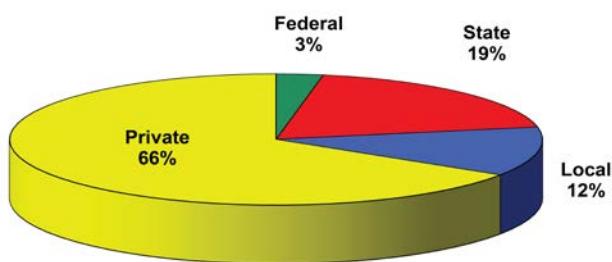
Forest Resource Summary

The forest resource of Massachusetts has great demands placed on it. Although Massachusetts is thought of as an urban State, about half of the land area is forested. This forested area is managed for a multitude of purposes, including recreation, water quality, wildlife habitat, and a forest product industry. About two-thirds (66 percent) of the forest land in Massachusetts is privately owned, with only 3 percent in Federal ownership; however, 31 percent is in State and local town ownership, which is unique in the region. The 2015 Massachusetts forest inventory estimated that there are about 3 million forested acres in the State and that the forest land area has not substantially changed since 2010.

The forests of Massachusetts are made up of a wide variety of forest species — most commonly red maple, eastern white pine, eastern hemlock, American beech, sweet birch, sugar maple, northern red oak, yellow birch, black cherry, and white ash. The predominant forest type is oak/hickory with maple/beech/birch the second most common.



Forest Land Ownership in Massachusetts, 2012



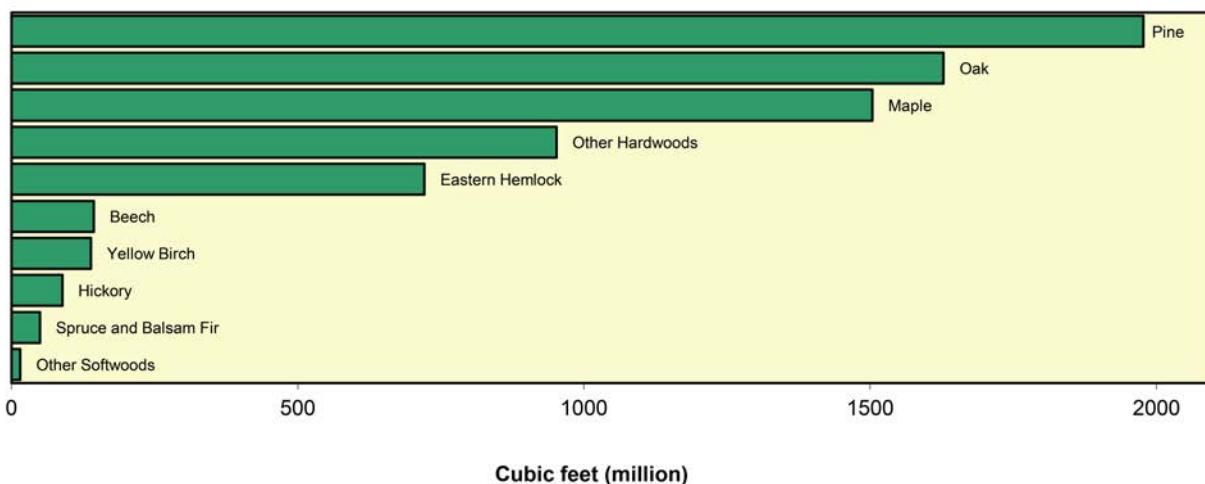
Forest Service
Northeastern Area
State and Private Forestry



Massachusetts Department of
Conservation and Recreation
Division of Forests and Parks

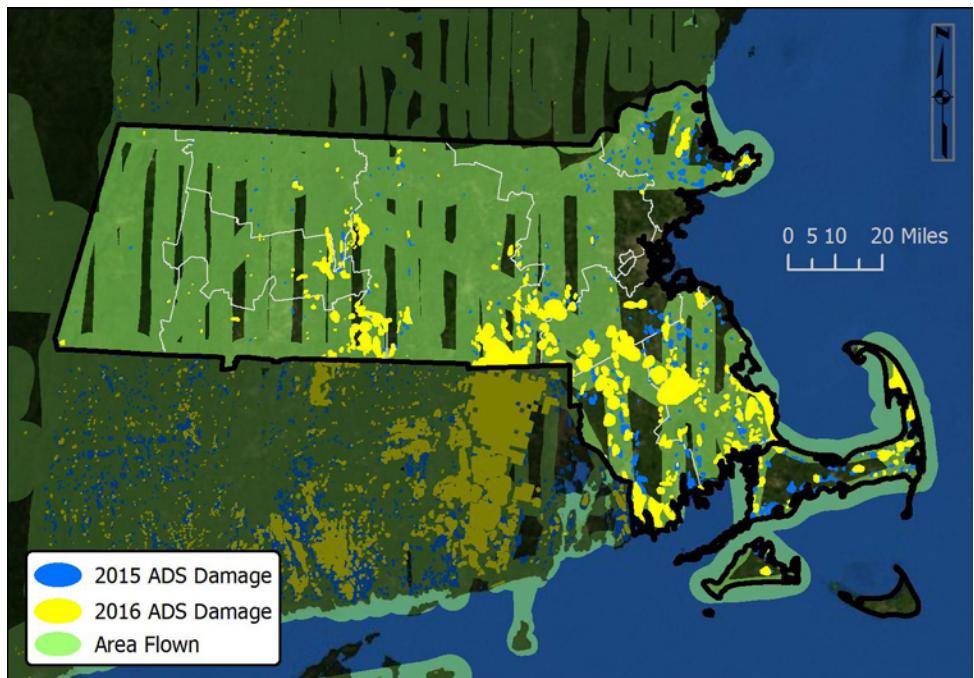
June 2017

Net Volume of Growing Stock on Timberland by Species in Massachusetts, 2012



Aerial Survey

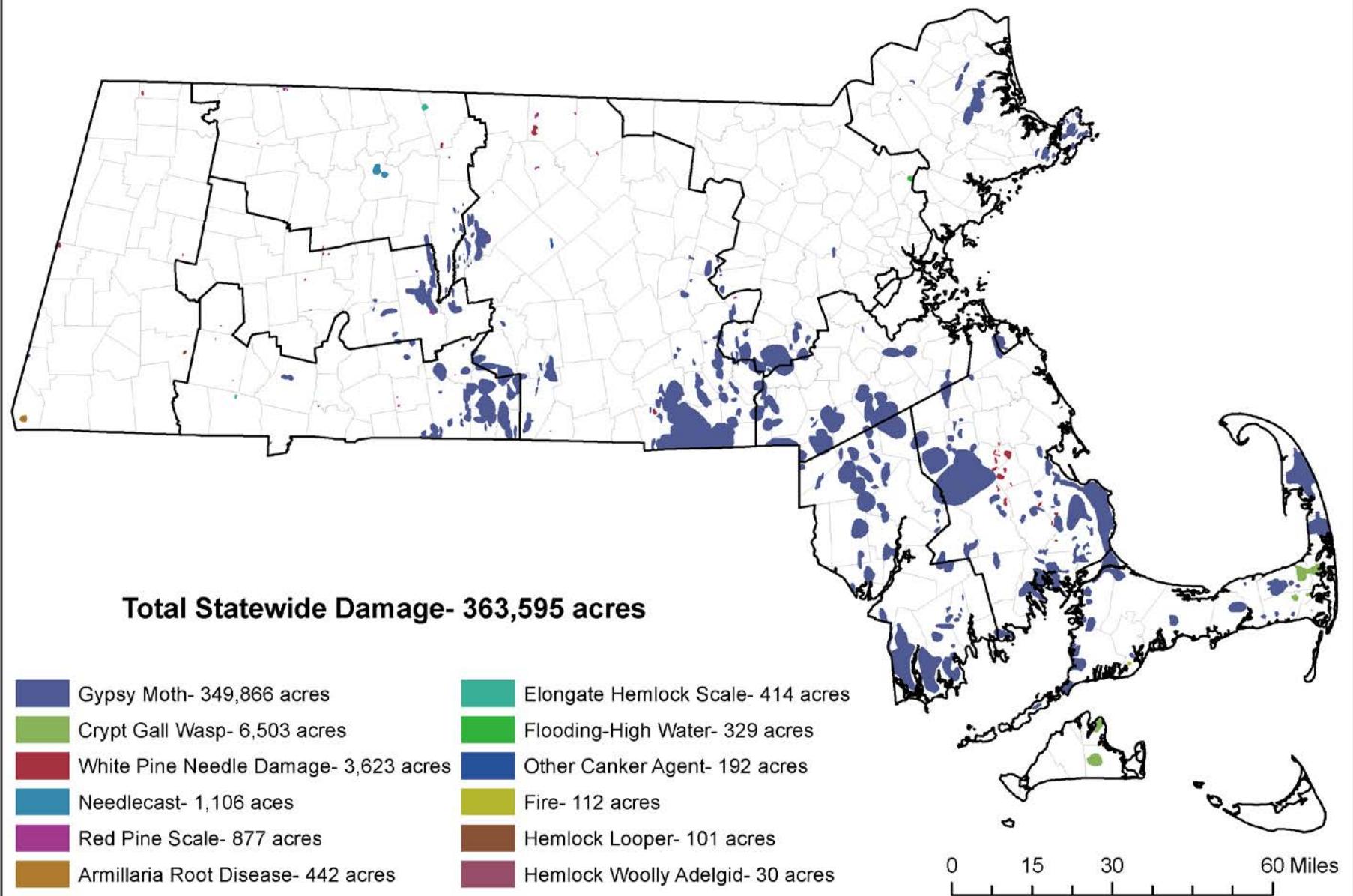
There were 363,595 acres of defoliation or mortality documented statewide from the annual aerial survey in Massachusetts in 2016. Most of that damage was a result of gypsy moth defoliation (349,866 acres). There was also cynipid gall wasp defoliation of black oak on Cape Cod and Martha's Vineyard (6,503 acres), needlecast damage on pitch pine (1,106 acres) and needle damage on white pine (3,623 acres), and scattered defoliation and mortality from red pine scale (877 acres).



Comparison of aerial detection survey (ADS) results for Massachusetts in 2015 and 2016.
(Map: U.S. Forest Service, Durham, NH)

2016 Aerial Survey

Massachusetts Department of Conservation and Recreation
Forest Health Program





Gypsy moth defoliation in Falmouth, MA. (Photo: Felicia Andre, Massachusetts Department of Conservation and Recreation)

Special Pest Surveys

Massachusetts Department of Conservation and Recreation (DCR) Forest Health Program personnel deployed and monitored 20 green funnel traps used to monitor emerald ash borer (*Agrilus planipennis*) throughout Massachusetts. Traps were concentrated in areas of high risk, including campgrounds and highway rest areas. There were no adult emerald ash borers caught in the funnel traps in 2016.

White ash trees were girdled at 10 locations statewide to monitor emerald ash borer. Girdled trees were cut down in October 2016 and had their bark peeled to determine the extent of the spread of emerald ash borer in the State. No new finds of emerald ash borer were located using trap trees in 2016.

DCR also assisted the University of Massachusetts entomology program with monitoring winter moth populations using both aerial and ground surveys. Winter moth larval monitoring is used to determine release locations for the predatory fly *Cyzenis albicans*.

Other Forest Health Projects

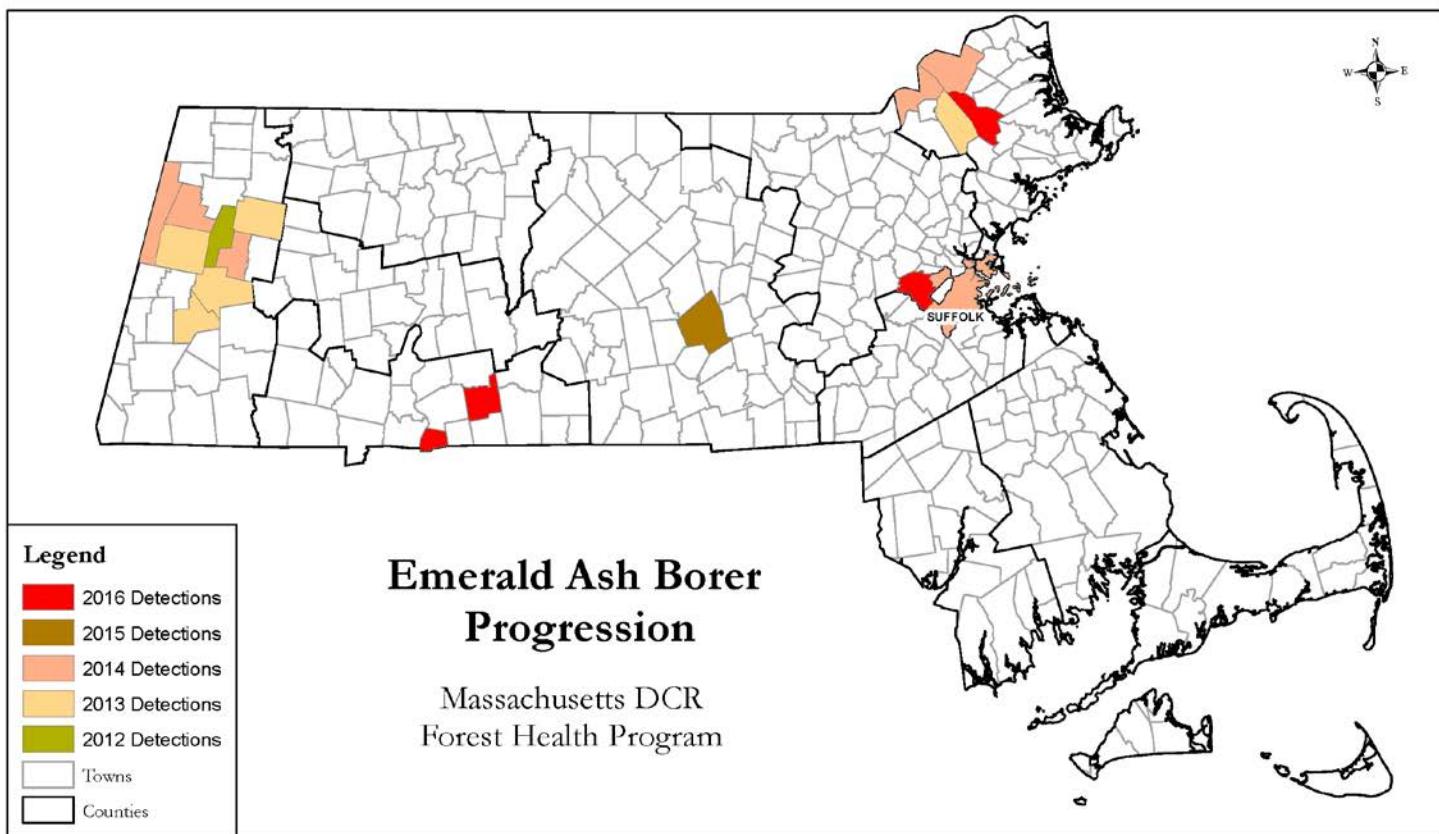
The DCR Forest Health Program continued to supply the USDA Animal and Plant Health Inspection Service's Otis Method Lab with wood for the rearing and research of Asian longhorned beetle, emerald ash borer, and spotted lanternfly.

DCR conducted biosurveillance for emerald ash borer across the State by locating and monitoring areas that had the predatory wasp *Cerceris fumipennis*.

The DCR Forest Health Program continues to be the lead State agency in charge of the Asian longhorned beetle eradication efforts in Worcester County. Using a U.S. Forest Service grant, DCR personnel deployed and monitored 600 Asian longhorned beetle pheromone traps in the Worcester County infestation. Traps did not locate any Asian longhorned beetles within the quarantine zone in 2016.

DCR continued monitoring release sites where two biological controls, *Oobius agrili* and *Tetrastichus planipennisi*, were placed for emerald ash borer control in Berkshire and Essex Counties. Both biocontrol agents were also deployed for a new infestation of emerald ash borer found in the Town of Wilbraham (Hamden County). Four new emerald ash borer-infested communities were recorded in 2016: Boxford, Longmeadow, Newton, and Wilbraham.

Twenty-five southern pine beetle traps were deployed across the State and concentrated in stands of two- and three-needle pines. Traps captured southern pine beetle for the first time on Cape Cod National Seashore properties.



(Map: Massachusetts Department of Conservation and Recreation)

Forest Health Highlights

Hardwood Defoliators

No **winter moth** defoliation was mapped during the annual aerial survey in 2016. Efforts by the U.S. Forest Service and the University of Massachusetts to use the biological control fly, *Cyzenis albicans*, are making slow but steady progress. Populations of the predatory fly are now being established in 14 locations.

Damage from the **Cynipid gall wasp**, also called the **black oak gall wasp**, was mapped on 6,503 acres on Cape Cod and Martha's Vineyard. Defoliation from this insect pest continues, and some major tree mortality is now noticeable. In some areas with high densities of gypsy moth defoliation this past growing season, combined with the cynipid gall wasp injury, there are thousands of dead black oak trees. With continued levels of gypsy

moth defoliation in these areas on already stressed black oaks, there could be another year of high oak mortality next growing season. In addition, the U.S. Forest Service found a stem canker (*Diplodia corticola*) affecting black oak trees already infested with the gall wasp.

Areas of **gypsy moth** defoliation (349,866 acres) were mapped statewide during the annual aerial survey. This is a tenfold increase in acreage affected from 2015. Most of the acreage was mapped on the South Shore in eastern Massachusetts with some additional heavy defoliation mapped near the Quabbin Reservoir in the central part of the State. Signs of the *Entomophaga maimaiga* fungus were minimal on caterpillars, which may be the reason for the dramatic increase of gypsy moth populations compared to 2015. This difference may be due to the recent drought conditions, which may have inhibited fungal growth during the past two growing seasons.



Female gypsy moths laying eggs. (Photo: Rich Anair, Massachusetts Department of Conservation and Recreation)



Gypsy moth pupae. (Photo: Charles Citrone, USDA Animal Plant Health Inspection Service)

Conifer Insects

We continue to observe the spread of **red pine scale** statewide. Large areas of mortality and rapid defoliation are now being mapped aerially with 877 total acres of red pine damage documented this past growing season.

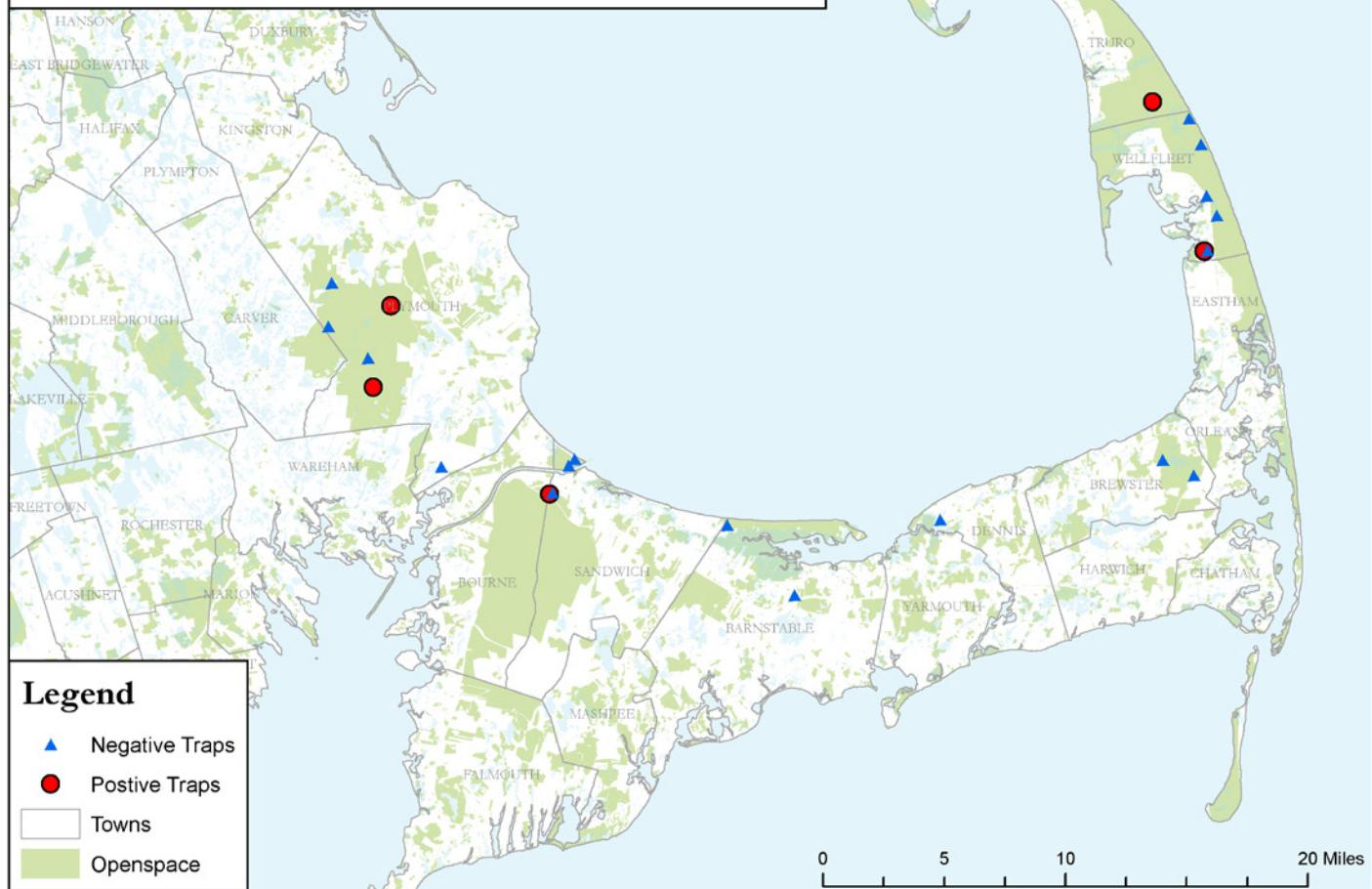
Hemlock woolly adelgid populations increased this year due to warmer temperatures during the 2015–2016 winter season. DCR continues to monitor the previously released biological control agent *Laricobius nigrinus*.

Elongate hemlock scale has been noticed statewide causing more stress on hemlocks. A total of 414 acres of defoliation were observed during the aerial survey. This is the first year acreage was mapped that could be attributed to defoliation caused by this insect.

Southern pine beetle was found in 5 out of 25 pheromone traps deployed by DCR in 2016.

2016 Southern Pine Beetle Trap Results

Massachusetts Department of Conservation and Recreation
Forest Health Program



(Map: Massachusetts Department of Conservation and Recreation)

Conifer and Hardwood Diseases

White pine and pitch pine needlecast diseases caused 3,623 acres of damage during the 2016 growing season.

Armillaria root disease caused 442 acres of tree defoliation and mortality in the southwest corner of the State. This is an area that has had a history of forest health issues mapped in prior years caused by pear thrips, anthracnose, and hail damage, among others.

Abiotic Concerns

With the drier than normal growing conditions in 2016, several areas of forest fire damage were mapped. A total of 112 acres of human-caused forest fire damage were recorded during the annual aerial survey.

References

Land Cover Map

Jin, S.; Yang, L.; Danielson, P.; Homer, C.; Fry, J.; Xian, G. 2013. A comprehensive change detection method for updating the National Land Cover Database to circa 2011. *Remote Sensing of Environment*, 132: 159 – 175.
<http://www.sciencedirect.com/science/article/pii/S0034425713000242>. (1 March 2016).

Forest Land Ownership

Oswalt, Sonja N.; Smith, W. Brad; Miles, Patrick D.; Pugh, Scott A. 2014. Forest resources of the United States, 2012: a technical document supporting the Forest Service 2015 update of the RPA Assessment. Gen. Tech. Rep. WO-91. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. Table 2.
http://www.fs.fed.us/sites/default/files/media/types/publication/field_pdf/GTR-WO-91.pdf. (1 March 2016).

Net Volume of Growing Stock on Timberland by Species

Oswalt, Sonja N.; Smith, W. Brad; Miles, Patrick D.; Pugh, Scott A. 2014. Forest resources of the United States, 2012: a technical document supporting the Forest Service 2015 update of the RPA Assessment. Gen. Tech. Rep. WO-91. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. Tables 23 & 24.
http://www.fs.fed.us/sites/default/files/media/types/publication/field_pdf/GTR-WO-91.pdf. (1 March 2016).

Massachusetts Forest Inventory

Butler, Brett J. 2016. Forests of Massachusetts, 2015. Resource Update FS-89. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.
<https://www.nrs.fs.fed.us/pubs/52012>. (14 April 2017)



Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

U.S. Department of Agriculture
Forest Service
Northeastern Area
State and Private Forestry
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
<https://www.na.fs.fed.us>

Forest Health Protection
Northeastern Area
State and Private Forestry
271 Mast Road
Durham, NH 03824
603-868-7714

Massachusetts Department of
Conservation and Recreation
Division of Forests and Parks
51 Military Road
P.O. Box 484
Amherst, MA 01004-0484
413-253-1798 Ext. 204
<http://www.mass.gov/eea/agencies/dcr/>